

CLAIMS

1. A catheter adapted for performing a task at a location inside a lumen, the catheter comprising:
 - a) an outer sheath;
 - b) a balloon capable of inflating inside the lumen when the catheter reaches the location; and
 - c) a balloon inflation tube, which is attached to the balloon and carries a fluid which causes the inflating of the balloon, said balloon inflation tube running through the outer sheath, movable relative to the outer sheath, and stiff enough so that it can be used to push and pull the balloon relative to the outer sheath.
2. A catheter according to claim 1, wherein the inflation tube comprises:
 - a) a relatively flexible outer balloon inflation tube with a lumen, extending substantially to the tip of the catheter; and
 - b) a relatively stiff inner inflation tube element, which runs through the lumen of the outer balloon inflation tube and is movable with respect to the outer balloon inflation tube;whereby moving the inner inflation tube element back from the tip of the catheter makes a distal portion of the catheter substantially more flexible than when the inner inflation tube extends to the tip of the catheter.
3. A catheter according to claim 2, wherein the inner inflation tube element has a lumen which carries the fluid which causes the inflating of the balloon.
4. A catheter according to any of the preceding claims, and including a propulsion compartment located proximal to the balloon, the propulsion compartment comprising an outer tube and an inner tube, said tubes being concentric, wherein one of said outer tube and inner tube can slidingly move in relation to the other of said outer tube and inner tube in response to a pressure exerted thereon by a fluid introduced into one or both of said outer tube and inner tube.
5. A catheter according to claim 4, wherein one of said outer tube and inner tube is the outer sheath, and the balloon inflation tube runs through and is attached to the other of said outer tube and inner tube.

6. A catheter according to claim 5, wherein the outer tube is the outer sheath.
7. A catheter according to claim 5, wherein the inner tube is the outer sheath.
8. A catheter adapted for performing a task inside a lumen, the catheter comprising:
 - a) a balloon capable of inflating inside the lumen; and
 - b) a balloon inflation tube which is attached to the balloon and carries the fluid which causes the inflating of the balloon, the balloon inflation tube comprising a relative flexible outer balloon inflation tube which extends substantially to the tip of the catheter, and a relatively stiff inner inflation tube element, which runs through the lumen of the outer balloon inflation tube and is movable with respect to the outer balloon inflation tube;whereby moving the inner inflation tube element back from the tip of the catheter makes a distal portion of the catheter substantially more flexible than when the inner inflation tube extends to the tip of the catheter.
9. A catheter according to claim 8, wherein the inner inflation tube element has a lumen which carries the fluid which causes the inflating of the balloon.
10. A catheter according to any of claims 1, 2 or 8, wherein the task comprises dilating the lumen.
11. A catheter according to any of claims 1, 2 or 8, wherein the lumen is inside the body.
12. A catheter according to claim 11, wherein the lumen is a blood vessel.
13. A catheter according to claim 12, wherein the task comprises placing a stent.
14. A catheter according to any of claims 1, 2 or 8, wherein the balloon inflation tube comprises stainless steel.
15. A catheter according to any of claims 1, 2 or 8, wherein the balloon inflation tube comprises NiTi.

16. A catheter according to any of claims 1, 2 or 8, wherein the balloon comprises plastic.
17. A catheter according to any of claims 1, 2 or 8, wherein the balloon comprises a polymer.
18. A catheter according to any of claims 1, 2 or 8, adapted for using a guide wire.
19. A catheter according to claim 18, adapted for using an "over the wire" guide wire.
20. A catheter according to claim 18, adapted for using a "rapid exchange" guide wire.
21. A method of positioning a balloon of a balloon catheter in a lumen, the method comprising:
 - a) positioning the balloon approximately; and then
 - b) fine adjusting the position of the balloon, said fine adjusting comprising moving an inflation tube of the balloon catheter relative to an outer sheath of said catheter, by manually manipulating said inflation tube.
22. A method according to claim 21, wherein moving the inflation tube relative to the outer sheath comprises moving the inflation tube while keeping the outer sheath stationary with respect to the lumen.
23. A method according to claim 21, wherein positioning the balloon approximately comprises moving the entire catheter through the lumen.
24. A method according to claim 23, wherein positioning the balloon approximately also comprises using hydraulic force.
25. A method according to claim 21, wherein positioning the balloon approximately comprises using hydraulic force.

26. A method according to any of claims 21-25, wherein fine adjusting also comprises using hydraulic force to move the balloon, while keeping the outer sheath of the catheter stationary with respect to the lumen.
27. A method of manipulating a balloon catheter through a lumen comprising both sharply curved portions and partially obstructed straight portions, the method comprising:
- a) arranging a moveable stiffening element to extend substantially to the tip of the catheter, when manipulating the tip of the catheter through the partially obstructed straight portions; and
 - b) arranging the moveable stiffening element to be withdrawn some distance back from the tip of the catheter, when manipulating the tip of the catheter past the sharply curved portions.
28. A method according to claim 27, wherein the stiffening element is located inside a balloon inflation tube of said catheter.
29. A method according to claim 27, wherein the stiffening element comprises a balloon and a balloon inflation tube of said catheter, and arranging the stiffening element to be withdrawn some distance back comprises withdrawing the balloon into an outer sheath of said catheter.